snowmelt contribute to primary water sources for people residing in the mountain West and Arctic areas. Many communities obtain their drinking water almost entirely from snow and glacier meltwater. These water sources may contain airborne contaminants.

Snow is being sampled at two sites in each park for three consecutive years. These sites are located in or near two watersheds in each park selected for comprehensive water, sediment, and biological sampling. Snow samples are collected by USGS researchers with assistance from the National Park Service and other partners. Crews collect samples near the time of annual maximum snow accumulation but before the onset of spring snowmelt. Researchers dig two large snow pits and then cut a vertical column of snow from each pit. Sampling crews must use clean techniques to shovel, bag, and transport approximately 40 gallons (150 liters) of snow from each site, which will yield about 13 gallons (50 liters) of meltwater for analysis. Access to the sites is by aircraft, snowmobile, skiing, snowshoeing, hiking, or pack animals. Samples collected from each snow pit are analyzed for major ions, nutrients, dissolved organic carbon, trace metals, mercury, particulate matter, and organic contaminants.

The snow sampling project is part of the Western Airborne Contaminants Assessment Project (WACAP) to determine the risk from airborne contaminants to ecosystems and food webs in western national parks. Biological effects analysis of airborne contaminants from six ecosystem components (snow, water, sediment, lichen, bark, and fish) is being conducted in eight key parks in the West and Alaska (Rocky Mountain, Glacier, Sequoia, Olympic, Mount Rainier, Denali, Noatak, Gates of the Arctic). Contaminant concentrations in moose consumed by subsistence hunters will also be assessed in Alaska. The Environmental Protection Agency, USGS, USDA Forest Service, Oregon State University, and University of Washington are working in partnership with the National Park Service on this assessment. Information acquired through this project will enhance scientific understanding of the global transport of airborne contaminants and their associated effects on sensitive ecosystems in western parks. It will also help the National Park Service determine what actions may be needed to mitigate potential effects or protect subsistence populations. Some contaminant signals or combinations may be used to determine where the industrial by-products or pesticides originate and whether these sources are local, regional, national, or international. Contaminant deposition in the snowpack will be related to contaminant levels in air, lake water, lake sediments, plants, and fish, thereby linking ecosystem impacts to airborne contaminant pathways. ■

tamara_blett@nps.gov
Ecologist, NPS Air Resources Division; Lakewood, Colorado

Partnering to reduce risk of West Nile Virus

By Betsie Blumberg

The combined efforts of volunteers and several government agencies are reducing the risk of West Nile Virus at Allegheny Portage Railroad National Historic Site and adjacent state game land in Pennsylvania. Trash and tires had been dumped illegally on these lands over many years, creating breeding habitat for mosquitoes that may carry the disease. On two separate cleanup days in 2003, cooperating agencies eliminated these breeding grounds.

Good riddance to bad rubbish! Trucks dispose of tires abandoned at Allegheny Portage Railroad National Historic Site and adjacent state game lands, reducing breeding habitat for mosquitoes, carriers of West Nile Virus.

In June, volunteers from the local Target store worked with Pennsylvania Cleanways of Blair County, the Pennsylvania Game Commission, and the National Park Service to collect 8 tons of trash and tires from one large dump on the game land and along several miles of historic portage trace at the national historic site. The park law enforcement officer, Tom Stinedurf, coordinated the event with Dave Thomas of Pennsylvania Cleanways. That cleanup was so successful that Thomas contacted the national historic site again about three old dumps on park and game land where hundreds of tires had accumulated.

The result was a project involving six government agencies, coordinated by Stinedurf, Thomas, and Natural Resource Manager Kathy Penrod of Allegheny Portage Railroad. On the cold and rainy cleanup day in October, prisoners from the state correctional institution at Cresson did the work, heavy equipment brought in by the Pennsylvania Game Commission moved and loaded the tires and trash, and trucks and drivers from the Pennsylvania Department of Transportation and Blair County Solid Waste and Recycling hauled it away. Together they removed about 1,400 tires and 5 tons of trash.

By the end of the cleanups the dumps were gone for good. The sites are now clear and will no longer attract trash. And, most importantly, they no longer support breeding ground for potential carriers of West Nile Virus. ■

bmb4@psu.edu
Writer-Editor, Penn State University, under cooperative agreement with the NPS Northeast Region; University Park, Pennsylvania